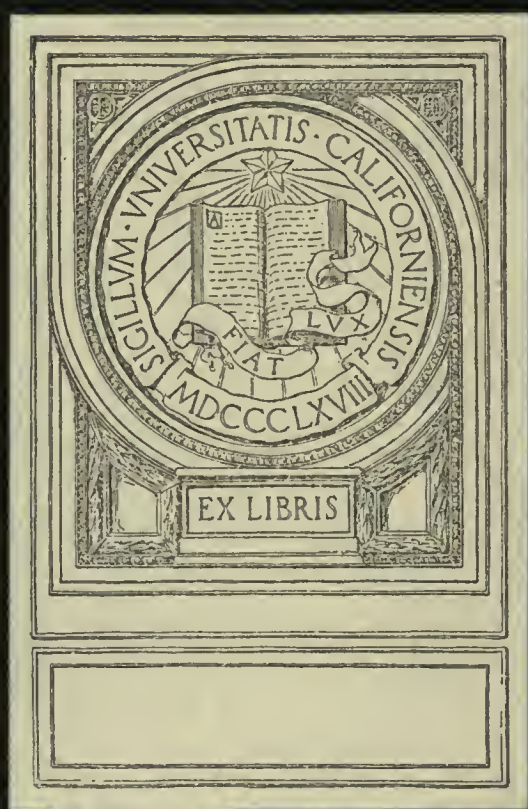


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SOME IMPRESSIONS

OF

MESOPOTAMIA IN 1919.

BY

Sir JOHN P. HEWETT, G.C.S.I., K.B.E.

The Report for the Army Council on Mesopotamia by Sir John P. Hewett has already been published by His Majesty's Stationery Office.)



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SOME IMPRESSIONS OF MESOPOTAMIA IN 1919.

By SIR JOHN P. HEWETT, G.C.S.I., K.B.E.

The area of the two vilayets of Basra and Baghdad is about 108,000 square miles. The extent of the country, including the Mosul vilayet (42,000 square miles), is 150,000 square miles. The population of the vilayets of Basra and Baghdad has not been taken by a regular census. Endeavours are now being made to obtain an approximate estimate of it. Judging from the information available, it may be assumed to be between 1,500,000 and 1,800,000. Even if it approximates to the latter figure after adding the population of Mosul, estimated at about 250,000, a total is reached of only 2,000,000 (1). The area is thus about that of a large province in India. The population is far below that of the smallest province there.

It was hoped that about 2,000,000 acres of land would come under cultivation in 1919. The forecast of the Irrigation Department is that 1,320,000 acres are likely to be harvested this year. My own opinion—for what it is worth—is that the area cultivated was above 1,500,000 but under 2,000,000 acres. The development of the country depends on the extension of irrigation, and the provision of a population adequate to cultivate the land commanded by water. Sir William Willcocks estimated that an area of 7,000,000 acres of wheat and barley could be irrigated from the waters of the Tigris and Euphrates. In addition, 1,000,000 acres of rice and 3,000,000 acres of millet, &c., could be cultivated. Thus, from the point of view of its existing population, and of the area likely to come under cultivation in the near future, Mesopotamia (the term being used to designate the three vilayets of Basra, Baghdad and Mosul) is a comparatively small country.

It is essentially an agricultural country. Outside oil, its mineral resources appear to be insignificant. The possibilities of its development seem to be in the production of cereals, oilseeds, cotton, beet and fruit, in the manufacture of sugar from beet, and in the breeding of sheep and, possibly later on, cattle.

A good deal of currency has been given to exaggerated ideas of the wealth of Mesopotamia. The country should have a great future, but it is not likely to become an El Dorado at once. I could not obtain the figures for the budget of the current year, but understood that the revenue was estimated to be 2,000,000 sterling. If that is really the estimate, it seems to be a conservative one.

The first impression which one gains on a visit to Mesopotamia is that the countryside is remarkably quiet. The population has in its possession large quantities of arms, but the carrying of arms is discouraged. One sees no one going armed, and over wide tracts there is no sign of a soldier of our own army. One might have imagined that, in a country where life is valued very cheaply and lawlessness has always been rife, there would have been a number of instances of assassination on political and similar grounds. These have been wonderfully rare, and none at all, I believe, for many months.

It may be that when the size of the army is reduced, as is proposed, to two divisions and two cavalry brigades, breaches of law and order may become more numerous. But, on the surface at all events, the Arab appears to be pleased that it is no longer necessary for him to go armed. And a good system of village police under the control of the headman, and of armed police drilled to a high state of discipline and stationed at centres from which they can be readily despatched to deal with local troubles, should enable law and order to be maintained effectively in the more settled tracts. Among the nomad tribes the Sheikhs will no doubt, subject to the control of the political officers, be vested with a considerable measure of authority.

The quiet of the countryside is emphasized by the absence of the villages, and the enormous areas of land of very fertile character which lie untouched by the plough.

Old canals and water channels, stretching in every direction, exist all over the country, and there are signs of former cultivation everywhere. One realizes at once that the country is a very fertile one which has not for a long time given the fruits of the earth to anything like the extent to which it should have. In many places the nomad camps on the banks of the river are the only signs of the country being inhabited.

Another physical feature which impresses itself on one every mile one goes is the extraordinary absence of trees, other than date palms and fruit trees in small orchards round fixed habitations. Both sides of the Shatt-el-Arab, as one approaches Basra, are covered with the most magnificent areas of date palms. As one proceeds north they are limited to the surroundings of the occupied villages, till eventually the date palm comes to an end at Tekrit, where there is a small family of three trees.

The date palms are said to number over ten millions, and are a most essential feature in the wealth of the country. Oranges, grapes, peaches, apricots, plums, greengages, mulberries, figs and pomegranates grow well, and there are a few indifferent apples. Willows, on the foreshore of the Euphrates, and in other places where they have been able to grow, owing to the dampness in the soil, are almost the only other trees which one sees anywhere. The shortness of fuel—willows are burned for charcoal—is very marked, and the greater portion of the population depends for its fuel supplies on the camel thorn, which grows in profusion in most places.

The main obstacle to the early development of Mesopotamia is undoubtedly the shortness of the population. Although there is a certain amount of unirrigated cultivation every year, and the amount of land sown but unprotected by irrigation is very considerable in a year where the rainfall has been so propitious as it has this year; it is fair to say, of the Basra and Baghdad vilayets generally, that irrigation is an absolute necessity, not merely an advantage, in production. The ability to develop irrigation is limited by the amount of labour available (1) to dig the canals and (2) to cultivate the new lands which such canals can irrigate. The present Civil Commissioner is of opinion that the area now under cultivation is nearly as much as the existing population can deal with by existing methods. It is the opinion of all the most experienced officers of the civil administration whom he has consulted that the policy of the administration for some years after the war should be to endeavour through the Agricultural Department to improve the quality of the crops grown, and the yield per acre, and in certain cases to improve the local methods of cultivation rather than to seek to open up fresh areas. That there is immense scope for improvement in the methods of cultivation is indisputable; and it is the fact that, while the area under crop at the present moment is much higher than it has ever been since Babylonian times, there are areas now commanded by canals which have not been cultivated this winter. There is then no advantage in pressing on large schemes such as have been suggested for the irrigation of the country without first looking round to see whether, if more canals are constructed, the land irrigated by them can be cultivated.

There is a very interesting article by Miss Gertrude Bell on land and labour in Mesopotamia, printed as Appendix VI. to the report by Messrs. Holland and Wilson, on the prospects of British trade in Mesopotamia and the Persian Gulf. At a meeting of the Royal Geographical Society on 15th November, 1909, at which Sir William Willcock's projects for irrigation in Mesopotamia were discussed, Miss Bell remarked: "It is difficult to overestimate the mobility of labour in Oriental countries. This points to an economic condition in the Turkish Empire which it is important to bear in mind; everybody is short of a job. I am inclined to believe that the moment Sir William begins his work, he will find labour coming to him in great quantities, and from very distant parts of the Empire. The rumour of a fixed wage will speedily bring people to Mesopotamia and, as the land comes into cultivation, that which is not occupied by the local population will be taken up by these immigrants." Such a movement could not be expected on a scale of any size except in peace time, and Miss Bell, writing in February, 1917, felt that "when all local sources of supply have been taken into account it is unlikely that the amount of labour available in the immediate future will be abundant." Miss Bell insisted on the need for regarding the labour question in Mesopotamia from the political as well as the economic standpoint. This aspect of the case cannot be neglected, though it seems possible that it might claim too much attention. Outside the Government land the tribal Sheikhs seem to claim a right in the land whether cultivated or uncultivated. If a marsh is drained, or some deserted land comes under the command of a new irrigation channel, a claimant to the land seems to appear at once from somewhere. Considering the relatively small amount of land now under cultivation compared to what might be cultivated were the schemes of Sir William Willcocks or some similar projects carried into effect, it is

difficult to imagine that the State in Mesopotamia, whatever it might be, would admit so promiscuous a claim. But the existence of a cultivating community, consisting entirely of Shias, constitutes a formidable bar, in the interests of peace and quiet, to the introduction of colonists belonging, in Miss Bell's words, "to an alien and non-absorbable civilization." This consideration seems to exclude the idea of any general immigration of Indians as cultivators, though every Indian who sees the land, envies its fertility. The Mahommedan cultivator from India is just as undesirable as the Hindu. He is usually a Sunni, and religious difference between Shias and Sunnis are apt to develop, as experience at Lucknow and elsewhere proves, into hostility as acute as that which is found between the Musalman and the Hindu. Were the area commanded by canals in Mesopotamia largely extended, Persians might be attracted to cultivate it, but the population of Northern Persia is sadly reduced, and little aid could come except from Southern Persia for a long time. Any appreciable influx of Mahommedan immigrants from beyond the seas seems at least uncertain. The Sudan needs all its population; Egypt could spare large numbers. The Arab in Egypt has, I believe, been singularly tenacious of his home when attempts have been made to induce him to move comparatively short distances, but this may not mean that he would not be ready to cross the seas were prospects sufficiently attractive. Mesopotamia seems to be a country which the Egyptian might be expected to like.

The Director of Labour has favoured me with some very interesting remarks on the possibilities of local labour in Mesopotamia, which are attached (page 16). I understand that the present Civil Commissioner estimates the amount of labour available for public works of different kinds at about 30,000. At the beginning of March the number of Arabs employed on labour, including 10,000 in the Mosul vilayet, where special measures had to be taken to employ some of the city population owing to local scarcity, was 39,415. This number will be rapidly reduced as soon as men become needed for agricultural operations. The rains had been so favourable for agriculture till the beginning of March that very little labour had been needed for irrigation of the crop. The greatest employer of labour is the Irrigation Department. It has during the past year never had anything like as much Arab as imported labour. At the beginning of March it had only 1,950 Arabs working in a force of 15,800. A large amount of flood protection has had to be done on the Tigris this winter. Out of 6,570 employed on this work only 300 Arabs could be collected. I have myself seen embankments being constructed on the Tigris between Amarah and Kut without any Arabs at all working on them. Vessels are loaded and discharged at the port of Basra almost entirely by imported labour. The figures* from the port showing how the different classes employed there have worked are interesting as showing how imported labour has to be relied on for this purpose. It is difficult to see how Mesopotamia is going to get on in peace time without imported labour in such matters as irrigation, railway construction, other public works and the work of the port of Basra.

So far as agriculture is concerned the shortness of labour may be neutralized to some extent by the introduction of agricultural machinery. Mesopotamia is, indeed, not so favourable a country for the use of tractors and harvesters as Arabistan is, as it is much cut up by water channels. But in spite of this, it offers considerable scope for the utilization of all kinds of agricultural labour-saving processes, and the more intelligent Arab is keenly alive to the advantages of adopting such processes.

But other measures are necessary if the country is to progress as it ought to do.

The doctrine of the survival of the fittest is well exemplified in the population of Mesopotamia. The Arabs who grow up, male and female, are a strong sturdy race though syphilis is prevalent. The women are healthy and prolific. In the absence of vital statistics reliable figures are unobtainable. But medical opinion calculates that there is a birth rate of about 26 per mille, that 12 to 15 per cent. of the children born die before they are a month old, and another 50 per cent. within the year. The death rate among children between birth and 15 years of age is thought to be as high as 75 per cent. The greatest need of Mesopotamia is an efficient civil medical service. Its function should be to improve the general health of the population and to raise the standard of health and physique. A rapid increase of the population should accompany the growing prosperity of the country, and the working capacity per head of the population is certain to increase as the result of improvement in the personal health of the individual. One error to be avoided in the creation of such a service is the unnecessary multiplication of administrative officers. No scheme is likely to succeed which does not depend in the first instance on the keenness of those directly in contact with the people whom

* Appendix E, page 19, shows this best.

it is designed to benefit, and the introduction of any machinery calculated to check initiative or to cause obstruction and delay is to be deprecated. The civil surgeons should be chosen for their wide experience in medicine and surgery; their efficiency will be much enhanced by a knowledge of bacteriology; the influence will depend on their character and personality. To induce good men to join the service the conditions of employment in it must be made attractive. Any rule restricting private practice is likely to discourage men from joining it. There seems to be great work for lady medical officers. The Arab seems very keen to get advice of a good doctor. They seem quite ready to go to hospitals under the charge of British officers and are not reluctant to submit to operations. I have seen them, men and women, thronging the dispensary of an Indian Sub-Assistant Surgeon in whose advice they had reason to feel confidence.

The health of the outlying communities, of the tribes on the river banks, and of the population in the desert could be provided for by a system of travelling dispensaries in specially equipped motor ambulances and motor launches. The popularity achieved by travelling dispensaries in India leads one to feel sure that they would be much appreciated in Mesopotamia. Special attention is required for the treatment, both in stationary hospitals and in peripatetic dispensaries, of eye diseases, which are distressingly prevalent.

Medical officers of health will be necessary in the large towns who should have under them medical inspectors, sanitary inspectors and women inspectors, whose special charge would be the improvement of infant hygiene. The employment of trained British women would be an experiment, and it seems certain that their help would be appreciated, and that they would be able to give most valuable assistance.

These matters have no doubt already received consideration at the hands of the civil authorities, and these very general suggestions are not made with the idea that there is any originality about them, but with the conviction that the creation of a medical organization designed to provide as far as possible for the effective treatment of the sick, and to raise, with as little delay as possible, the general standard of hygiene and comfort, is the first and most important problem which demands settlement from the point of view of the Arab population of Mesopotamia.

The great difference between Egypt and Mesopotamia is that in the former country water is most abundant in the Nile during the summer weather, whereas the floods come in Mesopotamia in the winter and spring, the rivers being at their lowest in the summer and autumn. Therefore, while Egypt depends mainly on cotton and other hot weather crops, Mesopotamia depends in large degree, and will continue to depend on the cereals produced by the crops sown in the autumn and winter, and reaped in the early summer. Water for irrigation being chiefly available during the months favourable for the growth of wheat and barley, these two staples are the main crops of Mesopotamia. Barley is the more prevalent crop in the lower part of the country. The proportion of wheat on the Euphrates increases in Ramadi and Hit, and west of the latter place little or no barley is cultivated. In the Basra and Baghdad vilayets the amount of barley to wheat was recently calculated at about 9 to 1. In the vilayet of Mosul wheat is a much more common crop than barley. A very good macaroni wheat is grown in the neighbourhood of Kirkuk, Alton-Kupri, Erbil and Mosul itself; practically it may be described as unirrigated. In the Karun Valley in Arabistan, whence grain for export goes to Basra, there is very little irrigation. The proportion of wheat to barley there is 2 to 1. Some of the wheat is of an excellent quality. In 1908 the export of grain from Basra amounted to 126,000 tons, in 1909 to 36,000 tons, in 1910 to 64,000 tons, in 1911 to 148,000, and in 1912 to 231,000. In 1911-12, 92,700 tons of grain were exported from Basra to London, and 63,300 to Hamburg and Antwerp. In 1912-13 there was a bad harvest, and the exports fell 20,350 tons for London and 4,800 tons for the other two ports; mostly barley, some rice, paddy and seeds. The trade has naturally died during the war, but this year there should be a great deal of grain for export. The difficulty this summer will be to lift the crop, both in Mesopotamia and in Arabistan. Prices in both places are at the moment very much on the downward grade, having been for some time at an artificial height. In the Baghdad vilayat in the hot weather of 1918, the price of wheat rose to over Rs. 1,000 a ton; by the middle of 1919 the price varied from Rs. 240 to Rs. 275 a ton, and that of barley from Rs. 60 to Rs. 90.

The Arab cultivator is the worst of whom I have had any experience. The Indian raiyat as a rule does not cultivate to a high standard of efficiency, but he is far ahead of the Arab. He has to work to get his land to yield him a good return. The Arab in Mesopotamia and Arabistan has not. Colonel Evans, the Director of Agriculture in Mesopotamia, has examined a large number of samples of both wheat and

barley from all parts of the country, and has no hesitation in saying that they are the worst commercial samples he has ever seen. The chief fault which he finds is that wheat and barley, as at present produced, are too mixed to be of real value. He has found that a sample of wheat will often contain so much barley that it is difficult to judge on first inspection whether it could be more accurately described as a dirty sample of wheat or a dirty sample of barley. It was this defect which led to the army ceasing this year to buy wheat produced under the agricultural development scheme. The purchase of wheat was not allowed if it contained over $17\frac{1}{2}$ per cent. of barley. It was found impossible to get wheat of this purity, and when the figure was raised to 25 per cent. it was still not found feasible to make satisfactory purchases. In addition to the excessive amount of barley in the wheat, samples are usually found contaminated with the seeds of the wild oat and other weeds, and often contain a high proportion of dirt. Weeds are common in the winter in Mesopotamia, but systematic weeding is not practised. In Arabistan the wheat-fields are full of such growths as mallow and a kind of charlock, and no attempt seems to be made to extirpate them. Apparently the hot sun during the ripening of the crop kills them. The miller does not want to find barley or wild oats in his wheat, nor the distiller to find wheat in his barley. There is another serious fault, in that different varieties of wheat and barley are too much mixed. The miller will want one kind of wheat and the distiller one type of barley. Colonel Evans finds that in the best of the samples five or six different types can always be picked out. They would include hard and soft grains, grains of different colours, and would vary in shape and size. The haphazard system of cultivation being largely responsible for these results, the remedy to be sought is the means of improving the methods of the grower. His practice is to sow the seed first and to plough it after irrigation. The land may have been cropped with barley in the previous year and much spent grain be in it. This is ploughed under with the wheat seed sown, and naturally a mixed crop results. It is easy to remedy this. If the land is irrigated so that the barley and wild oats dormant in the soil germinate and are then ploughed under, a clean seedbed on which the pure seed can be sown will result. The Agricultural Department, under the direction of Colonel Evans, has issued leaflets in Arabic explaining this to the cultivator. It is also endeavouring to ascertain what types of wheat and barley are likely to find the best markets, and is testing by experiment what varieties are likely to give the biggest yields. An improvement ought then to be speedily effected but the grain produced from the crop now on the land will necessarily be very mixed and very dirty. Colonel Evans' testimony gives very strong support to the contention of the Civil Commissioner that there is plenty of work for the Agricultural Department to do in improving the local methods of cultivation, bettering the quality of the crops grown and raising the yield per acre. This all points to the need for a strong and efficient Agricultural Department, a matter which will be returned to later. Improved methods of cultivation should certainly lead to increased out-turn. When he prepared his scheme of agricultural development in 1918, Mr. Garbett, then First Revenue Officer, calculated that the out-turn of the harvest should be $\frac{5}{8}$ ths of a ton per acre for barley and $\frac{1}{4}$ of a ton for wheat. Our conclusions in respect of the out-turn of the harvest produced under the scheme in 1917 were that the area under crop was from 550,000 to 600,000 acres, and the produce from 260,000 to 300,000 tons. The out-turn was according to these calculations, less per acre than Mr. Garbett had anticipated. In the estimate framed by Mr. Ward, Inspector-General of Irrigation in India, of the prospects of the crop now on the ground he took the out-turn of wheat and barley at an all round figure of $\frac{3}{8}$ ths of a ton per acre. When I saw Mr. Garbett in December last he appeared to favour this figure. According to our calculations of the results of the 1918 harvest it would be an under-estimate. It represents 840 lbs. an acre. This seems a very low figure for irrigated wheat and barley, considering that the soil of Mesopotamia is of such excellent quality.

In the statistical tables for the out-turn of wheat the standard of out-turn in India is taken as 12·8 bushels (100) = 768 lbs. But a large amount of the wheat produced in India is not irrigated. Mr. Moreland, late Director of Agriculture in the United Provinces, in his work on "The Agriculture of the United Provinces" (p. 203) writes that the out-turn of irrigated wheat in those provinces averages 1,200 lbs. or more to the acre. Mr. Morrison, at one time Inspector-General of Agriculture in India, referring to the cultivation of wheat in certain parts of the Bombay Presidency, estimated that a good irrigated crop of wheat might give 2,000 lbs. of grain, and over a ton of straw per acre, and a good dry crop 1,000 lbs. of grain and the same weight of straw. The out-turn of barley would be rather higher than that of wheat, but there is much husk and less barley than wheat is watered. The average would, of course, be lower than

these figures, but they are sufficient to show that there is a great margin for improvement in the out-turn of wheat and barley in Mesopotamia.

In paragraph 36 of their report, the Trade Commissioners write: "but our greatest hopes for the future of Mesopotamia are founded upon its possibilities as a cotton producing country." And, in accordance with their suggestion, an expert in the Indian Agricultural Service, Mr. R. Thomas, B.S.C., was sent to conduct experiments with varieties of Egyptian, American and Indian seed. These experiments were, owing to the short time available to Mr. Thomas for making his arrangements, confined to one plantation in the neighbourhood of Baghdad instead of being, as the Commissioners recommended, undertaken in different localities. The results are extremely interesting. It must not be forgotten that the land was specially fertile, the soil being a sandy loam with good natural drainage, but uncultivated for the previous three years. The number of waterings given was 17. Ten are given in Egypt and 12 in the Sudan. Colonel Evans considers that the plants were over-watered, and that 10 waterings would have been sufficient. The late arrival of some of the imported seed depreciated the value of some of the tests. The plants were withered by two frosts early in December. When I saw the plantation on 18th December I was much struck by the very large number of bolls in some of the plots which had, while still immature, been destroyed by the frost.

The results of Mr. Thomas' experiments are excellent; in considering them it is desirable to remember that it is highly probable that the returns would be appreciably less on land representative of the average Iraq soils irrigable by direct flow. The greater part of the soils in Upper Mesopotamia are stiff rather heavy clay loams, which will need careful cultivation and skilful irrigation if they are to grow good cotton. Cotton is being sown on these soils this year and the results will be interesting. The plots were $\frac{1}{10}$ th of an acre in size, the figures have been calculated to the acre yield from these plots. The best results were the following:—

Variety.	Origin.	Number of plots.	Average length.	Average yield of seed cotton in lbs. per acre.	Remarks.
			inches.		
Webber 49	American	1	$1\frac{1}{2} - 1\frac{9}{16}$	2,420	Pure type.
Punjab 47	Punjab-American ..	4	$1\frac{1}{2} - 1\frac{9}{16}$	2,107 $\frac{1}{2}$	"
Punjab 255F	Punjab-American ..	4	$1\frac{1}{2} - 1\frac{3}{8}$	2,057 $\frac{1}{2}$	"
Black Rattler ..	Sind-American	4	$1\frac{3}{8} - 1\frac{5}{8}$	1,982 $\frac{1}{2}$	Rather mixed.
Triumph	Sind-American	5	$1 - 1\frac{1}{2}$	1,906	Very mixed.
			mostly $1\frac{3}{8}$		
Turkish	Egyptian	3	$1\frac{3}{8} - 1\frac{7}{8}$	1,492 $\frac{1}{2}$	Mixed.
Allan's Staple..	Long Sind-American	5	$1\frac{3}{8} - 1\frac{5}{8}$	1,486	"

Mr. Thomas was able to sell the dead plants for firewood for three times the amount of the rent.

The results above are for seed cotton. The handbook on "Cotton and other Vegetables Fibres," by Dr. Goulding, published by the Imperial Institute in 1917, gives (p. 55) the average yield per acre in Egypt in the triennial period 1910-11 to 1912-13 as 424 lbs., and that in India in 1913-14 (p. 64) as 85 lbs. It is undoubtedly sown there on much bad and unsuitable land. There are thus great variations; 150 to 200 lbs. would probably be regarded as a fair return. Experiments in the Sudan give, I understand, something like 250 lbs. an acre. These figures are for lint, which weighs approximately one-third of seed cotton. The spinning and weaving results with last year's crop of cotton are not yet known. While it would not do to generalize too much from Mr. Thomas' figures, they can certainly be regarded as proving that a good long-stapled cotton can be grown in Mesopotamia. In Egypt cotton is sown between the middle of February and the middle of April. The first picking in upper Egypt is in August, and in the Delta in September. Dr. Goulding says, "the last pickings are picked in November." At the beginning of November, 1918, there was very little left on the ground.

In Mesopotamia sowings should be finished by the middle of April, but the weather is too cold to enable them to be begun as early as in Egypt. Seed will not do much more than germinate in March. Frost may be expected in Baghdad by the beginning of December. The crop must mature without the hot moist atmosphere which is so beneficial to it in Lower Egypt. The bollworm is a serious pest but the only one yet encountered. The problem of the selection of the best variety of cotton for different tracts has to be solved. On lands commanded by perennial irrigation from the canals.

taking off from the Hindiyah Barrage and the Digalah, as well as on lands supplied with water by pumps on the banks of the Tigris and Euphrates, it might be possible to cultivate cotton of a very good quality at a considerable profit provided that two difficulties can be overcome. The first is the inferiority of the Arab as a cultivator. He must develop much more interest and energy in the labours of the field than he has yet displayed if he is to make a success of the cultivation of cotton. The second trouble ahead is the difficulty of collecting hands to do the picking of the cotton. In Egypt, with its narrow strip of cultivation and its abundant population, the fellah who wishes his cotton picked, has only to hold up his hand to get as much labour as he needs. In Mesopotamia this difficulty will not be easy to overcome. Something might perhaps be done by organizing at centres of population labour corps of children, who might go picking from place to place under proper supervision. Arab children are very intelligent and would do the picking very well.

It has been suggested that Mesopotamia might be suitable for the cultivation of sugar cane on a large scale. The soil is probably suitable, but other factors which have to be considered, at all events in the Baghdad and Mosul vilayets, are not so encouraging. Cane requires a long period of growth. In the United Provinces the area under cane is about 1,250,000 acres—half the area under cane in India. It is sown in February and March, and the thicker and softer varieties do not ripen at a place like Bareilly, which is a great cane centre, till the following February.

I have been District Officer of Bareilly, where there is now a Government Experimental Sugar Factory. Bareilly is near the Himalaya, and has a cold winter, with frost occurring in December and January, just at the time when the cane is ripening. Growth is stopped and glucose keeps high. The cane crushed before February is found to be "high in glucose, low in sucrose, and the density of juice low." These conditions improve in the cane which is crushed after the beginning of February. In Bareilly there are short spells of very cold weather, perhaps twice or even three times after rainfall in the plains, and falls of snow in the Himalaya in December and January, when the wind is very bitter. Ordinarily the wind is from the west, and the heat of the sun is encouraging to growth. In Mesopotamia the conditions are less favourable to the cultivation of sugar cane. It would not start growth after being planted as quickly as in India. There, while it is comparatively young, it gets the benefit of the rainy season; in Mesopotamia it would after germination be exposed for 6 months of its young life to continuous heat, some of it very intense. A month or two later it would have to endure the weather produced by the winter rains with considerably more frost than in India, and, after each bout of rain, with a piercing north wind which checks all growth. It seems likely that, if it survived the severe hot weather of its earlier days, the violent cold would prevent it from ripening. This can, however, only be settled by experiment. If such experiment proves to be favourable, the Arab will have, if he is to make the cultivation of sugar-cane a success, to mend his present ways even more than will be necessary in the case of cotton.

The cultivation of beet for the manufacture of sugar seems to offer a better prospect. Beet does well everywhere from Mosul to Arabistan. At Mosul a considerable amount of it is cultivated. It may be that the kind now cultivated would be useless for the production of sugar. But all roots seem to grow well in Mesopotamia, and a suitable kind of beet could doubtless be grown. Why should it not be possible for Mesopotamia to manufacture all the sugar required for herself and for Persia? In 1911-1912, out of 124,000 packages landed by the Germans, 70,000 were sugar from Belgium. During the war Egyptian sugar and Hong Kong sugars (the latter imported by Japan, but having their origin in Java or Mauritius) seem to have held the market.

Between 1900 and 1905 the average value of seeds exported was about 90,000l., but it fell off later, and of recent years but for a little sesamum and linseed the cultivation of oil seeds seems to have been negligible. India has her linseed, cotton seed, cocoanut, gingelly, rape seed, sesamum and ground nuts; Egypt her cotton and sesamum, and Japan her soy beans. The soil in Mesopotamia is very suitable, and an agricultural country with its advantages ought not to neglect a crop of the commercial value of oil seeds, which may confidently be expected to bring very large profit to the cultivator. A small experiment by the Department of Agriculture in the cultivation of ground nuts at Fallujah gave most encouraging results, and endeavours are being made by means of demonstration farms to popularize their cultivation. Large quantities of ground nuts are at present imported into Mesopotamia for use in making sweetmeats. It ought not to be long before they and other oilseeds are exported in substantial quantities.

It may be inferred from what has been already said that perhaps the most urgent

necessity for the economical development of Mesopotamia is the establishment of a Department of Agriculture manned by a staff of officers fully equipped with technical and scientific knowledge. A Directorate of Agriculture was appointed by the Army in July, 1918, under Colonel G. Evans, a member of the Department of Agriculture in India. This Directorate was transferred to the Civil Administration with effect from 1st March. Colonel Evans was just the man to direct agricultural matters in Mesopotamia, being qualified alike by knowledge, administrative capacity and temperament, as well as being enthusiastic about the potentialities of the country. But sufficient inducements in respect of a programme of operations were not offered to him to remain in Mesopotamia, and he has resigned the appointment of Director in order to return to India. A general outline of his idea as to the development of the Department is contained in his memorandum of 18th December, 1918 (attached, page 30), which he was kind enough to amplify for me in his letter of 28th idem (also attached, page 29). His views on the subject seem to be very sound. Without a Department of Agriculture developed on the lines sketched out by him there is no chance of the resources of Mesopotamia being properly developed.

The Trade Commissioners (paragraph 63 of their report) urged that "tree planting on river banks, if only for the production of firewood, should be taken in hand at the earliest possible moment and a forest officer should be deputed to discover suitable species by experiment and to select localities for irrigated plantations."

The Director of Agriculture was under the Army Order appointing him given the control of afforestation, and the Board of Agriculture instructed him to advise the Civil Commissioners on forest matters. He has started several nurseries, among them a central one at Baghdad on an area of 10 acres, and spasmodic efforts have been made elsewhere to plant willow bush and other seedlings. An agricultural expert is not expected to understand about silviculture, and it was not till the beginning of 1919 that a forest officer was placed at Colonel Evans' disposal. There were a number of officers belonging to the Indian Forest Service in the force in Mesopotamia and the planting of trees might have been started much earlier under the direction of one of them. There is no greater need in Mesopotamia and it is to be hoped that a comprehensive scheme for treeplanting will be developed without further delay. There are many trees which seem to be suitable for Mesopotamia and which grow rapidly. They are needed for agricultural implements, firewood, charcoal and shade for man and beast. A great deal could be done in no time and a start has been made in a few places in tending and improving the willow plantations on the banks of the Euphrates and Tigris. Countless seedlings are lost every year in the flood water, which could be usefully transplanted to other places on the river banks or on the canals. The wood is useful for many purposes. Among others it produces charcoal though of indifferent quality. A number of trees such as eucalyptus, casuarina, shisham (*dalbergia sissoo*) acacia, (arabica and catechu) and poplar suggest themselves as likely to be suitable. This can, however, only be determined by experts after an examination of the climatic conditions and the soil. There is a variety of acacia lining both banks of the White Nile between Kosti and Dueim which grows very fast and will stand being submerged for months. The wood is heavy, sinks in water, is exceptionally hard and is said to be good for boat building and roofing timber. It might be suitable for growth in the many areas in Mesopotamia which are under water for a considerable period every year.

Cattle, as indeed do all domestic animals, thrive in Mesopotamia. The Arab buffalo is a large-framed animal with long horns, somewhat like the Indian buffalo found in Berar and the Southern Mahratta country, but larger. They are bred in large quantities along the rivers and in the marshes. The Arabs will not sell them. The Arab bullock is small, but hardy. The cow resembles the Jersey cow, except in the yield of milk. The likeness to the Jersey cattle is typical of the cattle throughout Arabia and Egypt where it has not been inbred with European stock. The local cattle are very susceptible to rinderpest. They have little to live on during much of the year. The essential means of improving the breed is by the introduction of fodder crops, such as lucerne and berseem (*trifolium Alexandrinum*), as rotation crops. At present there is no attempt at rotation of crops. The Arab goes in for rotation of soils: what is sown this year is left fallow next and produces the same crop in the third as in the first year. There is great demand for plough cattle especially in the Mosul vilayet where the Turks have left few. Sindhi bullocks have been introduced to some extent and the Arab farmers are eager to get more.

Dairy farms were organized over two years ago to supply the hospitals. They have supplied about 15,000 lbs. of milk daily, and the demands of hospitals for cream

and butter in Basra, Amarah, Kut, Baghdad, Nasariyah, Ramadi and Hillah. With the reduction of the demands for hospitals, milk, cream and butter has become available for sale. The dairies are built on the latest plan with the most up-to-date pasteurizing and chilling plants and cold storage rooms. All the cattle sheds are temporary structures.

It was originally intended to purchase cattle in the country, and some 350 head were bought. It was found that the average yield of milk was about 3 lbs. per head, so the experiment was made of introducing Indian cattle (chiefly from Sind), and buffaloes of the Murrah or Delhi kind. This has proved most successful. The strength of the herd at the beginning of the year was 2,324 Indian cows, 28 Arab cows, 43 Indian bulls, 16 Ayrshire bulls, 2,105 young stock and calves, 449 buffaloes, 15 Indian buffalo bulls and 593 Indian bullocks.

In addition to the supplies for the stock on the dairy farms, 800 tons of fodder are supplied monthly to the transport and other Army animals. The Indian cows are partly Sindhi and partly Gujarati. The former are much the better milkers. The average yield of the Indian cow is 8 lbs. a day. I saw one Sindhi cow in the Baghdad farm which had given over 5,000 lbs. of milk. The yield of each cow daily is registered with great care. After a fall of rain when it is very damp and cold, the cows suffer greatly in temporary buildings. When I saw the farm at Baghdad it was a day or two after rain, and its condition was indescribable. This is unavoidable—when the rain falls the soil (which contains no stone in it) is for several days reduced to a sticky mire. This occurs at frequent intervals during the winter. During the fall of the rain the wind is in the south—the change of the wind to the north results in the clouds being dispersed, and the weather becomes very cold. This is a very trying time for cattle. I saw the Amarah farm in March when the weather had been settled for a fortnight, and the winter rains seemed to have passed away. The cows could not have been in better fettle.

Twenty-four Ayrshire bulls have been imported. They should be as successful here as in India. Out of 24 imported 8 have died. This compares very favourably with the results of their importation into India, and considering the lack of comfortable stabling and the difficulty of complete isolation under war-time conditions, is very encouraging. They had, in many cases, had rinderpest and piroplamosis. They look extremely well and have been serving cows freely. There are already a few young calves by Ayrshire bulls out of Sindhi cows, and they are charming little creatures. Gujarati cows have been crossed with Ayrshire bulls, but no calves have been born as yet. The calf by the Ayrshire bull from the Sindhi cow loses the hump, which the latter possesses, entirely.

The young stock that I saw was almost entirely by Sindhi bulls out of Sindhi cows. At a year old it looked extraordinarily well. It is intended to retain the females from the best milking dairy to improve and increase the Government herds. The milk yield of each individual cow is registered and poor milkers ruthlessly eradicated. The most select young bulls will be sold to Arabs to improve the stock in the country, and the rest castrated and sold as plough cattle. There should be a very material improvement in a few years in the size and yield of indigenous cattle if the Arab will only realize that it will pay him to feed his cattle well. At present so far as one can judge he does little for either his milch cows or his plough bullocks.

The common breed of sheep in the Basra and Baghdad vilayets of Mesopotamia is the fat tailed sheep which is similar to the Dumba sheep of the north-west frontier province of India and the neighbouring countries. The breed is apparently found throughout most parts of Afghanistan, Baluchistan, Persia and Arabia. The type varies with the locality, probably as the result of environment and pasture. This sheep has a large frame and has long somewhat coarse wool. The male is horned. The colour varies between all shades of white, brown and black, the two latter predominating greatly in Baghdad and Basra vilayets. The Arabs say that the black sheep stand the rigours of the climate better than the white one. The sheep seem to suffer a good deal during the excessive cold of the winter, and they have been described to me as collecting in the heat of the summer and turning their faces inwards to avoid the sun and glare and thus losing at the same time all chance of benefiting from what air there may be. The total absence of shade and shelter must be very bad for sheep. Trees are required to give them shade in the hot weather. Reeds abound in the marshes which could be used to form a rough shelter for them both from the cold and heat, at very small cost indeed.

A good sheep, as sold to the Army, will weigh, dressed, about 50 lbs. This weight is often exceeded and perhaps 80 lbs. is reached. But the best sheep of course remain

at the disposal of the tribal Sheikhs. A small flock of specially selected white sheep is kept on the Amarah farm. The fleeces of six of the whitest sheep were sent to the Cawnpore woollen mills for valuation in June, 1918. The report on them was to the effect that no wool of an exactly similar type is procurable on the plains of India, but wools similar to it are imported from Nepal, Tibet, Turkistan and Baluchistan. The defects found in the samples were :—

- (1.) Most of the fleeces were very dirty and contained a large amount of burr and dung.
- (2.) The colour was not good. Fleeces, which appeared to be white, contained a high percentage of grey or yellow wool. Only one sample was found to be throughout even approximately white.
- (3.) The samples varied considerably in fineness, one or two containing a considerable percentage of fine wool.

The length of the wool is good, and it seems quite clear that the sheep of Mesopotamia is capable of great improvement by judicious breeding and more careful treatment. I have spoken to many Australians who are much impressed with the fine prospect of sheep breeding in the country. The climate of New South Wales seems from the range of its temperatures to approximate most closely to that of Mesopotamia. The smaller Merino from the warm parts of that country ought to do well in Mesopotamia, and its introduction, coupled with improved treatment of the sheep, ought to lead to greatly improved results from sheep breeding. The introduction of the Merino strain into India has been found to have a very beneficial effect in point of weight and all-round richness. As a country for breeding sheep India can bear no comparison with Mesopotamia. The country will carry a large head of sheep, and at certain seasons of the year the grazing which they get is ideal. Very little labour is required to manage them. They are nomadic like their masters, and, perhaps, for this reason, do not seem to suffer much from epidemic disease. At present the flocks have been very much depleted owing to the demands of the Army on them. The Arab does not shear his sheep properly. Wool is often used as a currency and, when the Bedouin wants a little wool to pay for anything, he will pluck a handful of it from the back of the nearest sheep. Nor is it the practice to wash the sheep. Such wool as gets to the market gets to it in the worst possible condition. The skins of the local sheep are highly regarded. Were some sheep shearing stations established along the rivers it would be very easy to introduce a regular time for the clip, and to ensure that the sheep were properly washed before being sheared. May and June would perhaps be the best time for the clip as the sheep need their wool in the winter and hottest weather (July to September) to protect them at one time from the cold and at the other from the heat. The Arabs will fall in with the requirements regarding shearing of their sheep as soon as they realize that it will pay them. The introduction of careful methods of shearing and dipping, and of packing the fleeces, should enable Mesopotamian wool to gain a high place in the market.

There are two lambing periods, one in the autumn and the other in the spring. Success depends very largely on the food available for the flock. Last year the fodder was better than it had been for years and lambing was consequently very good. It could be greatly improved if the owners of flocks would grow some fodder for them. The time of greatest need is the autumn when the country is almost entirely denuded of natural herbage. Berseem would cost little to grow, while as a rotation crop it would be of much value. In the dried form—known as dries in Egypt—it ought to be very useful for feeding sheep. On the whole the prospects of sheep breeding in Mesopotamia seem to me to be most encouraging. The Arab if left to himself will never initiate the changes that are required. But he would follow the lead shown to him by the European, and, provided that the authorities do not discourage the latter, he ought to find the roll of pioneer in the improvement of sheep breeding, not unremunerative. The amount of wool exported from Basra in 1918 was 4,125 tons of the value of 306,000*l*.

The sheep in the Mosul vilayet are of different types from those in Basra and Baghdad. The chief varieties are (1) a large-legged white sheep with a brown face and brown legs. The males have long and curved horns like the black-faced mountain sheep of Scotland. This sheep has rather coarse wool on the leg, and is not good for mutton. (2) A small black-faced sheep with a long nose and a tuft of brown wool between the ears. This type is a very fine small sheep, short in the legs with a fine thick heavy fleece and producing good mutton.

The country round Mosul city has limestone hills and good turf, and there are

enormous areas which had in February, when I was there, splendid grazing for sheep. The flocks appeared to be very few. There are very few black and brown sheep in the Mosul vilayet, and in this respect the flocks there present a striking contrast to those of the two southern vilayets, where black and browns largely predominate. By careful selection and by importing rams, probably the small merino would be the best, here too it ought to be possible to breed a very good type of sheep there.

On my way home through Persia I saw a sheep which is the mascot of the band of the 2nd Bn. Gurkha Rifles. This was served out as a lamb for rations to the regiment at Baqubah in August, 1917. The band was allowed to keep it as a pet. It is now the most magnificent sheep which I have ever seen, and has a splendid fleece. One can imagine from this how the breed in Mesopotamia can be improved if it is only looked after and fresh blood is imported.

Colonel Garrow, the Acting-Director of Irrigation, has recently prepared a scheme of irrigation having in view "not only the requirements of the immediate future, but also the complete restoration of the country." It would be vain for anyone not equipped with the necessary technical knowledge to express an opinion on the merits of his scheme. But as it raises a general issue of a most important character it will perhaps be as well to attempt some description of the general principle on which it is based.

Colonel Garrow has had experience of irrigation problems in Egypt, and speaks with authority. According to his view neither the Tigris nor the Euphrates is in natural *régime*. The bed of the former has, he says, been raised so that flood-spills occur the whole of its length and it is unable to carry a maximum flood discharge. Water has been withdrawn wholesale along its entire length; in its lower reaches its carrying capacity has been much reduced. In the flood season cultivation is menaced—this I have seen myself especially above Kut and between Kut and Amarah. The river is flanked by marsh areas, many of which are permanent throughout the year, and which, with the river in its present condition, cannot be drained. The Euphrates is in a worse state than the Tigris as, while the latter preserves its identity to the sea, the former loses itself in flood time in several enormous marsh areas, and it is not navigable in the low water season throughout its length. The river is now changing its character rapidly below the Hindiyah barrage. As a preliminary to the development of irrigation Colonel Garrow proposes "in its interests as well as those of conservancy, gradually to augment and concentrate the supply in the rivers commencing at their downstream ends by closure of all superfluous side channels and escapes and by the erection of flood bunds." "The rivers," he contends, "will accommodate themselves to the increased discharge, sink themselves into their beds, and ultimately be capable of carrying their maximum flood discharge to the sea instead of dissipating them over the face of the country as at present. The water levels in the rivers being thus lower it will be possible to drain the marsh areas into them, put the land now covered by water under the plough and arrange for a co-ordinated irrigation system. Not only so, but drainage water from irrigated tracts can then be led back to the rivers which will act as the main drains of the country instead of, as at present, as principal though ill-begotten canals."

His policy aims at—

- (1.) Getting the rivers to do their work as rivers by carrying the full discharge in the flood season, and acting as the main drains of the country, and
- (2.) Arranging for the withdrawal of supplies for irrigation purposes through the medium of principal canals at infrequent intervals with fixed discharges for the rivers at the points of off-take.

Colonel Garrow has developed a scheme based on these principles to embrace—

- (a.) The consolidation and development with increased efficiency of areas at present provided with best controlled irrigation systems.
- (b.) The remodelling of channels in areas where, owing to deterioration and neglect, irrigation has to be practised in a wasteful manner and at the expense of the rivers.
- (c.) The maintenance, improvement and extension where necessary of existing channels in categories (a) and (b) and of river flood bunds.
- (d.) The survey of areas and the collection of data to enable future projects to be presented, including proposals as to flood escapes.

This is an attractive programme. It manifestly, however, depends on the suggestions for the control of the rivers being sound. On this point Dr. A. B. Buckley, who went with me to Mesopotamia, and is, like Colonel Garrow, a distinguished

member of the Irrigation Department in Egypt, joins issue with him. He points out that Sir William Willcocks has stated that the confinement of the rivers between certain limits is not feasible. Mr. Buckley contends that on the inference that the changes in the rivers are attributable to the acts of man, it is fair to argue that the Tigris if left to itself would not have undergone a change and would now return to its natural state. This position he urges "requires careful examination, for, while it might be comparatively easy to induce the river to return to its natural state, it will probably be the reverse if the river is now in its natural condition and had to be artificially confined to a limited and definite channel." Sir William Willcocks, holding that the two rivers cannot be confined between banks, proposed to escape the excess water into the Habbaniyah (near Ramadi) and the Aggar Quf (near Baghdad) Lakes.

Mr. Buckley holds that, unless Sir William Willcocks' investigations are radically incorrect, the amount of water which may pass the Fatha Gorge where the Tigris issues from the Jebel-Hamrin is nearly double the amount which can pass Baghdad when the river is at its maximum level of 35 metres on the Residency gauge. Moreover, the discharge at that gauge is given by Sir William Willcocks as 5,500 M. 3/Sec., while he computed the flood discharge from the sections of the river near Beled, where the delta begins, at about 9,000 M. 3/Sec. The only canal, Mr. Buckley says, which could have brought a great artificial change above Baghdad is the Nahrawan taken off the river near Tekrit. Sir W. Willcocks estimates that the canal has been out of use for from 600 to 700 years. Mr. Buckley contends that the inference is that the river from Baghdad upwards at the present time is in its natural condition, and that to confine it within banks would be an operation which might be accompanied by considerable difficulties and must involve heavy expenditure. It would be unprofitable to follow Mr. Buckley's arguments regarding the Lower Tigris, the Euphrates and the general programme based on the assumption that it is possible to confine the rivers between definite limits. Enough has been said to show that an issue of the first importance—capable of settlement by experts only—has been raised by Colonel Garrow's programme—questions relating to irrigation, navigation and drainage are all involved. The Trade Commissioners proposed the establishment of an Irrigation Board, consisting of at least two highly qualified irrigation officers, to collect detailed information in regard to the rivers and existing canal systems with a view to making recommendations for the restoration of the *régime* of the rivers—a board more representative of the different interests involved seems to be required. For the time being the Irrigation Department has been placed in charge of the Conservancy of the Tigris. Sir George Buchanan expressed the opinion that a prolonged study of the conditions of the Tigris is required. Such a study seems necessary, but in view of the urgent need of utilizing the river to the best purposes it should not be too prolonged. There are many interesting subjects which would need to be considered by such a board and which could not be properly disposed of by one constituted only of experts in irrigation. For instance, the effect on the Fao bar of large quantities of silt scoured out of the beds of the Tigris and Euphrates by preventing the dispersal of their flood waters would have to be considered. It would perhaps be not more unreasonable until the matter had been thoroughly investigated, to assume that a large increase in the volume of water entering the estuary at high tide would enhance the intensity of the ebb, and might counteract any tendency to the increase of the Fao bar by the deposit of additional silt, than to anticipate a contrary result as being likely to result from the fact that more silt would be moved by the two rivers. Again some irrigation officers feel very strongly that the cultivation of rice in those parts of Mesopotamia, especially the Shamiyah district, where it involves the supply of water from the rivers at a time when it is scarcest, cannot be justified from an economic point of view. Certainly, as a general principle, the utilization for the cultivation of rice, of water, which by another arrangement of distribution from the river, could be made available for the cultivation of larger tracts of wheat and barley, would not be regarded favourable by those who have studied revenue and agricultural questions, in the East. But, on the other hand, the political authorities feel very strongly about the need for maintaining this rice cultivation. Rice is much consumed among the Arabs both in Mesopotamia and in the adjoining Syrian desert. It is, although none that I have seen appeared at all equal to the best Indian qualities, exported to a considerable extent. In 1911 the value of the export was as high as (17,000L.) and paddy (109,000L.). It is evident that this question could not be left entirely to the decision of a Board of Irrigation Officers who might resent the cultivation of rice, in a country of such scanty rainfall as Mesopotamia being allowed in special tracts to be the dominating factor as regards canal development (2).

The remarks so far made relate directly or indirectly to the production in Mesopotamia; and, before leaving this subject a word or two might be said about the system of Civil Administration in the country. At present there are 14 divisions each in charge of a political officer with political assistants under him. The political officers and their assistants have been recruited from the political service in India, the Indian civil service the Sudan civil service and the army. Each political officer is in direct relations with the Civil Commissioner, who has as his Revenue and Financial Secretary, a member of the Indian Civil Service of some twenty years standing, who was formerly in the North-west Frontier Province. My short experience in Mesopotamia does not justify me in expressing any opinion on the system of the administration in force which has naturally been developed in war time, and doubtless bears the impress of its birth having taken place during war conditions. I may, however, perhaps express my general impression that the existing system of administration will prove too centralized for peace time, and that its personnel is generally not adequately equipped with administrative experience, or knowledge of such very important branches of the administration in an oriental country as revenue and police. The determination—for such I believe it is—to exclude persons from Great Britain and the Dominions from taking part in the development of the country seems to me to be very regrettable. I understand that it is based on the view that the country should be developed in the interest of the Arab population. On this very ground the introduction of Englishmen and Australians will be very beneficial. There are large areas of crown lands which they could develop without in any way trenching on tribal rights. If Mesopotamia is to take the place it ought to in such enterprises as cotton cultivation, the manufacture of beet sugar, and sheep breeding, the impetus will, in my judgment, have to come from the white man. A large and intelligent landowner was, in conversation with me, very emphatic on this point. He told me that he intended to appoint an Englishman to control and manage his estates.

To turn to the prospects of commerce in Mesopotamia. The value of the imports to, and exports from, Basra for the years 1908–1912 was :—

—	1908.	1909.	1910.	1911.	1912.
	£	£	£	£	£
Imports	2,411,568	2,360,102	2,634,596	2,855,677	2,653,984
Exports	1,784,382	1,504,004	1,668,714	2,525,937	3,246,560
Total	4,195,950	3,864,106	4,303,310	5,381,614	5,900,540

Excluding the value of goods consigned to Government, or imported on behalf of Government, the imports during the past four years have been :—

	£
1915	629,000
1916	2,711,000
1917	4,067,800
1918	7,401,700

The figures of imports for the past two years are remarkable and merit some consideration. They compare as follows :—

—	1917.	1918.
	£	£
Textiles and piece goods	1,920,000	3,620,000
Grain, flour and pulse	473,000	960,000
Sugar	380,000	946,000
Tea	66,000	440,000
Wood and timber	186,000	193,000
Tobacco and cigarettes	180,000	186,000
Coffee	153,000	133,000
Matches	17,300	86,000
Spices	14,600	73,000

The increase in the imports of textiles, piece goods, tea and sugar is due to the brisk demand anticipated in Persia as soon as the roads opened and transport became more readily available. The road from Baghdad to Kasvin and Enzeli is now open. If funds are given to complete it, it will be an excellent trade route.

The condition of this road compares very favourably with other roads, *e.g.*, that from Kasvin to Teheran still under the management of the Russian Company. No better surface could be found anywhere than that between Hamadan and Kasvin after descending on to the plain from the Ahoa Pass. The run from Hamadan to Kasvin in a Vauxhall car took 6 hours and 20 minutes.

The exports from Persia to Baghdad in the last six months of 1918 are valued at 742,000*l.* This figure does not fall far short of the total export trade (837,000*l.*) from Baghdad in 1906, and the value of the exports in the half-year exceeds the value for a whole year in 1911 (711,000*l.*) and 1912 (546,000*l.*). There is a considerable demand for British piece goods needed in Russia through both Resht and Meshed. Pack transport is very scarce, and it does not look as if any material increase of it is likely to become available in the immediate future. A carrier can, it is said, recover the whole value of his animals for a single journey between Baghdad and Hamadan. Arabs, who usually do not go beyond Kermanshah, are taking their camels to Hamadan. The road throughout its length is thronged with transport. The rates per ton at present charged—kindly ascertained for me by Colonel Moens, D.S.O. (commanding the lines of communication in Persia)—are remarkable—

	Winter.	Summer.
From Ruz railhead to—	£	£
Kermanshah	55	40
Hamadan	90	65
Teheran	149	110

The contractors assert that they have lost on the rates charged in the winter, but make a profit in the summer. Railhead was to be moved from Ruz to Quareta (about 30 miles) on 15th April. The distance from Kasvin to Teheran is 92 miles and to Enzeli (road in parts more difficult and at times even dangerous) 145 miles. The cost to Enzeli should be taken at a little more than the cost to Teheran. Piece goods shipped at Basra and exported to Baghdad have to pay freight from Great Britain and import duty 10 per cent. at Basra. The freight by river charged by Messrs. Lynch & Co. before the war as a regular charge was, according to the Trade Commissioners' Report (page 94), 40*s.* a ton, and they sometimes charged as high as 80*s.* a ton. We were informed by the Deputy Director of Telegraphs at Baghdad that the Department was charged by the firm not long ago Rs. 55 a ton for the conveyance of telegraph materials. The charge from Baghdad to railhead would be small; at Kermanshah there is an import duty (perhaps 5 per cent.), but it seems to be often evaded. The Chief Manager of the Imperial Bank of Persia at Teheran told me that this must be the case, as the receipts deposited with the bank did not nearly represent what the goods transported, according to the official figures which I gave him, should have paid. Some time ago the Persian Government, in order to stop the influx of roubles into Persia, prohibited export of goods into Russia. The prohibition has been withdrawn, but in its place there is the requirement that the exporter must deposit 30 per cent. of the value of the goods he exports to be liable to forfeiture unless he brings back to Persia goods of equal value within 17 days. The oil imported into Persia cannot, judging from the traffic on the road, at all approach in value the piece goods being exported, and yet exporters are, in spite of all the other heavy charges, said to submit readily to the confiscation of their deposits at Enzeli, and are said to be making 100 per cent. on the top of it all. It is difficult to comprehend the whole affair if one remembers that the kran is worth about half a rupee at present, that the exchange value of the rupee is 1*s.* 6*d.* and that you can on an English note easily get 100 roubles (Azerbaijan issue).

The value of the sugar imported into Basra before the war was—

£
295,000 in 1908.
359,000 in 1909.
449,000 in 1910.
539,000 in 1911.
292,000 in 1912.

The exports of sugar from Baghdad in the last six months of 1918 amounted in value to 168,000*l.*, and of tea to 119,000*l.* The latter figure is double that of the whole import

of tea into Basra in 1917. The exports from Baghdad in the last six months of 1918 amounted in value to 1,293,000*l.* The available pre-war figures for the whole year were—1909, 765,000*l.*; 1910, 853,000*l.*; 1911, 746,000*l.*; 1912, 981,000*l.*

The value of the principal exports from Basra in 1918 was—

	£	
Wool	306,000	
Dates	266,000	(incomplete, as duty on 5 steamer loads shipped at the close of the year had not been paid. Total value of exports is estimated at 933,000 <i>l.</i>).
Textiles	140,000	
Skins and hides	26,000	
Tea	16,000	

The tea and textiles were re-exported to Persia (Mohammerah). The export of wool and cereals ought to increase very considerably in 1919. The export of the chief cereals was prohibited in 1918. The exports of grain before the war (chiefly barley and wheat) were 126,000 tons in 1908, 36,000 in 1909, 64,000 in 1910, 148,000 in 1911 and 231,000 in 1912.

It is anticipated that there will be, as soon as peace conditions come in, a considerable demand in Mesopotamia for pumps and agricultural machinery, milling and building materials (especially timber) and luxuries such as European furniture, motor cars, launches and bicycles.

Trade should boom in Mesopotamia after the war. The import trade has been mainly transit trade. Not only ought it to change its character in some respect, but with Persia, north and south, alike demanding British goods now that Russia can provide none, the volume of trade between Great Britain and Persia ought to increase enormously. It is unlikely that Mesopotamia will supply the greater part of the demands north of Hamadan if arrangements can be made to use the Trans-Caspian route without destructive transit duties, but the state of the railway between Batoum and Baku is so bad at present that for the time Basra must remain the chief centre of import. So far as Persia up to Hamadan is concerned, the situation might be allowed were a line constructed from Baghdad *via* Hit, Anah, Deir-a-Zor, Tadmur, Homs to Tripoli or Haifa. This would tap the rich grain-producing country on the Euphrates (a line already runs from Baghdad to Hillah, the centre of this tract, and another to Dibban on the Euphrates on the road to Hit) and, if the metre-gauge line, which now touches the Persian frontier from Baghdad, were prolonged to Kermanshah, it would carry all the goods required from Europe for that part of Persia. The residents of Kermanshah and all the surrounding country appear most anxious for a railway. All along the journey through Persia the people were most friendly. They have cultivated their lands on, considering the way in which the population has been decimated, a wonderful scale, relying on us to see that, contrary to past practice, the man who sows a crop shall reap it. It would be a bitter disappointment to the cultivators were we to withdraw, and the men with a larger stake in the country would regret it just as much. It is hard to believe that the British ever exercised so great an influence in Persia as they do at present, and almost impossible to conceive that the influence could be enhanced. There is only one man in Persia and that is Sir Percy Cox. He very modestly attributes our position in there to-day to the behaviour of the British soldier, and doubtless this has had much to do with it. The spectacle of two Russian Armies and one Turkish Army going down the great road and up again carrying fire and sword wherever they went and burning and pillaging every village or homestead to which they came, has been succeeded by that of a small British force by which payment was made for every article supplied, and the men of which were not only exemplary in committing no acts of violence on their way, but showed active kindness to the inhabitants. Such a spectacle could not be without its effect, but it needed the personality and influence of a Percy Cox to raise British prestige in Persia to the point at which it now stands. It would be the greatest act of folly not to take advantage of it without delay to establish and consolidate commercial relations with Persia. From a commercial as well as a strategic point of view the prompt extension of the railway to Kermanshah seems the first step to take, and it seems hard to believe that the Persian Government would not readily assent to it.

NOTES.—(1.) The census returns record this estimate to be too low. The population is, I believe, taken officially as 2,000,000 in the Basra and Baghdad vilayets.

(2.) There has been a considerable amount of discussion on this subject since this Memorandum was written.—J. P. H.

MEMORANDUM BY THE DIRECTOR OF LABOUR. (See page 11.)

THE POSSIBILITIES OF LOCAL LABOUR IN MESOPOTAMIA.

The following notes may be useful in determining the amount of imported labour that will be required in Mesopotamia after the war and will help to dispel the idea that we shall be able to rely more on local labour than during the war :—

Number of Arabs employed.—The largest number of Arabs that have ever been employed in Mesopotamia since the Occupation is 45,058 in April, 1918. This figure had gradually increased from May, 1917, after the Occupation of Baghdad, and there is no doubt that we were then employing a large number of the agricultural population who had left the land to seek employment and food after several months of starvation.

The prospects of a good harvest caused the Sheikhs to ask, through the political officers, for the return of cultivators.

By July, 1918, we had been obliged to release 13,000 men, reducing our total to 32,226 between Basra and Samarra. See Appendix (A).

In November, after the Armistice was signed, we were further asked to release Arab labour for cultivation, and I disbanded three Arab Labour Corps at Basra, which were composed entirely of Felaheen, which brought the total for the same area down to 28,526.

To-day, including the whole of the Mosul area in which we employ some 10,000 Arabs, the Arab labour return stands at 39,405.

More releases are contemplated, and we even expect to disband Local Corps, who are not actual cultivators, in areas where cultivators are required.

Labour for irrigation work.—To-day the Irrigation Department employs far more labour than any other department and most of their work is done by imported labour. See Appendix (B) and (C).

This alone is sufficient to prove that the local labour is far from adequate to meet the ordinary post-war needs of the country.

I quote two examples of the most important works—

The Mahmusiyeh Canal.—In the case of the Mahmusiyeh Canal, the greater portion of the work had to be done by Indian labour, owing to there being insufficient population in that district.

The average number of Indians employed daily between 1st May and 31st December, 1918, was 2,714, whilst the highest figure was 4,267 in July.

The only Arab labour available for which we were given figures were 500 during May.

There are still 500 men of the 17th Labour Corps finishing off this canal.

I did not recruit any Arab labour from that district for any other works during that time.

The Khalis Canal.—In the case of the Khalis Canal, the Arab labour figures were more satisfactory, although far below what I anticipated would be available. Before the project was undertaken, I was asked if I could provide sufficient local labour for the work. I replied in the affirmative, judging by the previous year's figures of Arab labour employed in that area.

Unfortunately for my estimates, the Political Officer of the district required far larger numbers in 1918 for agriculture, and I was unable to bring pressure to bear on the inhabitants to produce sufficient men, and again the work had to be done mostly by imported labour.

We had great difficulty in keeping what Arab labour we had on the work, even by giving them rations and fairly high wages. It was obvious that they wanted to go to their cultivation, although the extra cultivation with a more reliable supply of water, which the new canal would open up, was no inducement for the Sheikhs to make their men work.

Appendix D shows the average number of Arabs and other labour employed during each month, and there are still 250 Indians remaining on the Khalis until 15th March.

Flood protection on the Tigris.—There is far from sufficient Arab labour even for the protection of the country from floods. Of the total 6,573 men employed on bunding the Tigris only 300 Arabs could be collected for this work. The remainder consists of Turks and Indians.

Between Kut and Ali Gharbi there are a few Arabs working on bunds round their own camps or villages, but they probably only amount to about 300. I know that part of the country particularly well, having spent six months among the Arabs there in 1916, and the population cannot provide more labour than it does at present.

Remarks on Arab labour.—Most of the Arab labour controlled by this department is round the towns and military stations, and consists of men, women and children of all ages.

Tribal labour is sometimes called upon by political officers to assist in irrigation and railway works, but these cannot be counted as part of the labouring population. They are all cultivators and will on no account leave their own tribal area for work which does not concern them.

We have sometimes called upon Sheikhs to supply a certain number of men for a labour corps, but they have always been disbanded when required for agriculture.

All the heavy portage is done by Persians and Kurds, whose numbers keep fairly steady, but they are only suitable as porters.

Possibility of increase.—I do not think we can hope to increase the Arab labour for at least a generation unless the desert tribes come into the cultivated areas and settle down under a peaceful administration.

Amount of imported labour required.—Without knowing what the programme of development of this country will be in the future, it is impossible to say how much imported labour will be required.

It is safe to assume that the present numbers of imported labourers cannot be reduced if the country is to be protected from floods; even in the ordinary way, railways and roads are to be maintained and cantonments built.

We shall shortly lose 10,000 Turks and 2,000 refugee labourers, and our Arabs are decreasing as agriculture increases.

A reduction of the present labour force by 20,000 after the surplus garrison has gone is all that we can allow.

(Signed) J. W. FROST, *Brigadier-General.*
Director of Labour.

**Appendices to the Memorandum by the Director of Labour,
Mesopotamia. (See page 16.)**

APPENDIX A.

SHOWING THE STRENGTH OF ARAB LABOUR AT ITS HIGHEST, ITS LOWEST, AND TO-DAY
COMPARED WITH OTHER LABOUR.

Date.	Indians.	Turks.	Refugees.	Persians.	Arabs.
April, 1918	32,553	..	..	12,571	45,058
July, 1918	36,640	..	..	13,410	32,226
March, 1919	32,381	17,899	2,818	21,369	39,415

NOTE.—Persian labour includes Kurds and the labour on Persian lines of communication.

APPENDIX B.

APPROXIMATE DISTRIBUTION OF LABOUR AMONG EMPLOYERS.

Department.	Indians.	Turks.	Persians.	Arabs.	Total.
Irrigation.. ..	5,226	8,677	..	1,950	15,853
Railways	5,375	1,809	3,430	2,470	14,084
Roads	3,909	989	6,622	1,158	23,102
Works	3,523	301	631	3,327	7,782
Inland Water Transport..	283	164	805	442	1,694
Porterage.. ..	6,219	2,415	6,893	8,838	24,365
Miscellaneous	3,988	658	2,077	5,430	12,153

APPENDIX C.

DISTRIBUTION OF LABOUR—IRRIGATION MAJOR WORKS.

Work.	Indians.	Turks.	Arabs.	Total.
Khalis Canal	1,915	963	..	2,878
Heraniyeh Head	700	..	250	950
Kifl Kufa Canal	615	1,931	..	2,546
Sakhlawiyeh .. ..	..	..	800	800
Hibbaniyeh	417	..	400	817
Qarradah .. ..	..	..	..	..
Revetment	932 646	} ..	..	1,578
Tigris Bunds .. ..	..	2,802	..	2,802
Hammer Lake .. ..	..	884	500	1,384
Nasiriyeh .. ..	..	400	..	400
Tigris Right .. ..	..	..	..	..
Bank Escape	1,700	..	..	1,700

APPENDIX D.

DAILY AVERAGE NUMBER EMPLOYED ON THE CONSTRUCTION OF THE KHALIS CANAL.

Daily average for				Indians.	Turks.	Arabs.	Total.
July	..	..	..	1,091	..	1,137	2,228
August	..	..	..	890	..	1,425	2,315
September..	..	..	..	1,157	..	1,141	2,289
October	..	..	..	2,500	..	1,019	3,519
November	..	..	..	2,432	..	1,042	3,474
December	..	..	..	2,856	2,330	897	5,583
January, 1919	..	..	..	1,992	868	..	2,869
February	..	..	..	1,540	873	..	2,413

APPENDIX E. (See page 13, footnote.)

DAILY AVERAGE TOTALS EMPLOYED BY IRRIGATION DEPARTMENT DURING THE PERIOD
2ND FEBRUARY, 1918, TO 2ND FEBRUARY, 1919.

Daily average for				Imported labour.	Arab.	Total.
February	..	..	..	5,603	5,230	10,833
March	..	..	..	6,068	5,242	11,310
April	..	..	..	4,141	2,513	6,654
May	..	..	..	4,028	1,585	5,613
June	..	..	..	3,309	1,052	4,361
July	..	..	..	4,711	1,772	6,483
August	..	..	..	5,090	3,589	8,679
September	..	..	..	4,455	3,317	7,762
October	..	..	..	4,834	3,860	8,694
November	..	..	..	5,165	3,732	8,897
December	..	..	..	7,312	2,749	10,062
January, 1919	..	..	..	7,259	2,420	9,679
2nd February, 1919..	..	..	..	10,783	2,395	13,178

NOTE.—In every month the imported labour has exceeded the Arab labour; the amount of imported labour has greatly increased, while the Arab, although on work which benefits himself, has considerably decreased.

This decrease is due to lack of population in some places and cultivation having prior claim on the labour in others.

COMPARATIVE STATEMENT OF LABOUR VALUES.

DECEMBER, 1918.

Kind of labour.	Day.					Night.				
	Men employed.	Tons discharged.	Tons per man per hour.	High.	Low.	Men employed.	Tons discharged.	Tons per man per hour.	High.	Low.
<i>General, Ordnance, Supply and Transport, &c.</i>										
Chinese	600	1,178	·34	·72	·14	2,724	6,337	·30	·76	·09
Indians	5,496	9,032	·21	·60	·05	4,598	6,115	·19	·40	·07
Turks..	1,720	6,210	·49	·93	·16	..	..	..	..	..
Persians	1,187	2,310	·23	·80	·11	746	1,722	·27	·47	·07

Kind of labour.			Day.					Night.				
			Men employed.	Tons discharged.	Tons per man per hour.	High.	Low.	Men employed.	Tons discharged.	Tons per man per hour.	High.	Low.
<i>Fodder.</i>												
Chinese	..	..	340	743	·30	·36	·23	1,727	4,900	·41	1·12	·17
Indians	..	..	385	706	·30	·49	·22	385	451	·16	·26	·13
Turks..	..	..	1,524	5,462	·45	1·00	·24	..	..	..	..	..
Persians	..	..	56	170	·43	·43	·43	..	..	..	..	..
<i>Grain.</i>												
Chinese	..	..	220	841	·66	·80	·46	475	1,862	·57	1·25	·18
Indians	..	..	371	2,000	·78	1·30	·56	256	865	·40	·50	·30
Turks..	..	..	720	4,219	·87	1·28	·61	..	..	..	..	..
<i>Firewood.</i>												
Chinese	..	..	..	..	..	..	..	230	428	·20	·30	·07
Indians	..	..	1,817	2,669	·20	·40	·03	1,225	1,720	·20	·40	·11
Turks	..	..	170	507	·63	·72	·51	..	..	..	..	..
Persians	..	..	170	536	·36	·54	·18	377	500	·14	·20	·09
<i>Timber.</i>												
Chinese	..	..	720	2,776	·52	·89	·30	1,084	2,179	·27	·40	·21
Turks	..	..	80	179	·35	·35	·35	..	..	..	..	..
<i>Royal Engineers, Railways, Inland Water Transport.</i>												
Indians	..	..	1,621	5,222	·49	1·22	·15	1,536	2,817	·30	·65	·08
Turks	..	..	250	923	·44	·62	·29	..	..	..	..	..
<i>Coal.</i>												
Indians	..	..	1,974	3,903	·23	·40	·11	1,565	2,881	·18	·30	·08
Turks	..	..	1,356	2,536	·26	·35	·11	..	..	..	..	..
Persians	..	..	784	1,525	·22	·36	·05	1,412	2,986	·20	·30	·07

JANUARY, 1919.

<i>General, Ordnance, Supply and Transport.</i>												
Persians	..	..	372	727	·30	·50	·03	312	1,553	·64	1·03	·23
Chinese	..	..	970	2,405	·27	·72	·22	1,795	3,986	·32	1·40	·08
Indians	..	..	5,429	11,103	·24	·66	·06	4,633	6,239	·25	·60	·11
Turks..	..	..	1,045	4,826	·63	1·27	·11	..	..	..	..	..
<i>Fodder.</i>												
Chinese	..	..	150	300	·27	·34	·21	1,545	3,464	·26	·25	·08
Indians	..	..	..	..	..	..	..	..	..	..	..	..
Turks..	..	..	1,255	3,915	·46	1·12	·11	..	..	..	..	..

Kind of labour.	Day.					Night.				
	Men employed.	Tons discharged.	Tons per man per hour.	High.	Low.	Men employed.	Tons discharged.	Tons per man per hour.	High.	Low.
<i>Grain.</i>										
Chinese .. ..	..	..	..	..	..	795	3,457	·47	·86	·18
Indians .. ..	..	..	..	..	..	..	..	..	..	..
Turks.. ..	815	4,637	·92	1·66	·44	..	..	..	..	..
<i>Firewood.</i>										
Chinese	65	180	·34	·34	·34	246	580	·22	·39	·14
Indians	398	653	·20	·22	·17	747	1,238	·17	·22	·10
Turks	678	1,125	·23	·34	·13	..	..	..	..	..
Persians	46	66	·18	·18	·18	97	35	·11	·11	·11
<i>Timber.</i>										
Chinese	444	1,053	·29	·45	·14	515	707	·22	·44	·43
Indians	748	966	·19	·33	·02	548	655	·16	·40	·06
Turks	240	262	·16	·20	·13	..	..	..	..	..
<i>Railways, Royal Engineers, Inland Water Transport, &c.</i>										
Chinese	480	1,226	·31	·43	·25	465	727	·19	·37	·15
Indians	108	216	·25	·25	·25	108	135	·25	·25	·25
<i>Coal.</i>										
Indians	2,696	6,230	·24	·68	·02	4,262	7,666	·21	·51	·02
Turks	2,574	6,124	·32	·58	·17	..	..	..	..	..
Persians	80	257	·35	·40	·30	307	482	·34	·41	·21

LETTER AND MEMORANDUM BY THE LATE DIRECTOR OF AGRICULTURE, MESOPOTAMIA.

(See page 4.)

Agricultural Directorate,
New Street, Baghdad,
28th December, 1918.

To Sir J. P. Hewett, G.C.S.I.

Dear Sir John,

I am returning my note on the future organization of the Agricultural Department in this country with a few amplifications as requested by you.

With regard to research, its importance is evident. Plant selection offers immediate prospects of success, as the crops grown in this country contain so many different varieties that they are nearly useless from a commercial point of view. The best prospects of success are likely to accrue from the careful plant to plant selection of existing field crops in the country. An economic botanist is, therefore, urgently required who would deal, in the first place, with suitable crops such as wheat, barley and rice.

Cotton is a special crop which, to all intents and purposes, is not yet grown in the country, but which holds forth such vast possibilities that a specially qualified officer is warranted. It is possible that a grant in aid to cover the cost of cotton experimental work could be obtained from the British Cotton Growing Association or a similar body.

Another line of work which offers great possibilities is the improvement of the indigenous fruits of this country. Certain centres appear to be excellently suited for the production of the citrus fruits and also stone fruits. Local cultivators, however, have very little idea of pruning, grafting and budding, and instruction on these points to the cultivators and the introduction of improved varieties would have immediate results. A proper system of grading and packing is also wanted. The economic botanist, therefore, would require a section on his own to deal with:—

1. The improvement of staple crops by selection and hybridization.
2. Introduction of cotton.
3. Improvement of the fruit industry.
4. A mychological sub-section to deal with fungoid diseases.

An entomologist is also urgently required, as insect pests are extremely abundant. I need only quote the date diseases, the stem borer, and the various varieties of locusts as a few of the instances which have already been brought to my attention in the last few months.

Also, an agricultural chemist for the department will be required, whose duties, apart from the ordinary analysis of soils, crops, manures, &c., will be fully occupied in dealing with the problems of salt and drainage. Another important section which will be necessary is that of agricultural machinery. Already, in this country, the local cultivator shows far more desire to invest in water lifts and labour-saving devices than he has ever done in India. Much pioneer work is required in this direction, especially with regard to tractors and to harvesting, threshing and winnowing machinery. The officer in charge of this section would be made responsible for training local mechanics in the erection and management of pumps and other agricultural machinery.

I need say little about the necessity for demonstration farms. The need is obvious. The real cultivator seldom travels far from his home and must have some place fairly close by where he can go and see the new variety actually growing or a new method being put into practice. It has been abundantly proved in India and Egypt that the issue of leaflets or the giving of lectures are, by themselves, of little value unless they can be backed up by a practical demonstration in the field. The danger of sending out new seeds before they are thoroughly tested has already been abundantly brought home in this country.

I may quote the case of Indian wheat which was imported last year and which failed, partly owing to the fact that it was of the wrong variety, and the case of potatoes, the cultivation of which was not understood by the Arabs, and which were also much too late a variety for this country. Indian maize also was issued for seed in large quantities last spring and failed to set cobs as it came into flower during the middle of the hot weather. Further experiment has proved that if sown in a gush, it gives a satisfactory outturn in October.

These mistakes were, of course, due to war conditions and were perhaps unavoidable to a certain extent, but we must take care to avoid such mistakes in the future and the only way to do so is by insisting on preliminary experimental and demonstration work in the field.

In conclusion, the staff at Headquarters (where we should have an agricultural school, combined with laboratories for research and an experimental farm) would consist of a Principal who would be an agriculturist and would also be manager of the experimental farm; of an economic botanist; a cotton expert; an entomologist, and an Officer in Charge of Agricultural Machinery (Agricultural Engineer). It will probably be necessary also to have a special officer to deal with sheep and cattle. Apart from Headquarters Staff, District Officers in charge of circles, who must be trained all-round agriculturists, are required at present.

Yours sincerely.

(Signed) A. EVANS, Colonel,
Director of Agriculture,
Mesopotamia Expeditionary Force.

Agricultural Directorate,
New Street, Baghdad,
18th December, 1918.

To

Memorandum.

SUBJECT: THE REORGANIZATION OF THE AGRICULTURAL DEPARTMENT.

1. The abrupt cessation of hostilities has naturally led me to consider the reconstruction of the Agricultural Department. The immediate and urgent necessity for supplying food and fodder for the Army of Occupation has, up to the present, occupied our chief attention. It is now time to consider the future lines of development of the Department. The rough scheme I am attempting to describe below is the result of much serious thought and of consultation with the more senior members of my Department, some of whom have had considerable experience in Agriculture Departments in other parts of the Empire, viz., India, Ceylon, Egypt and the Colonies.

2. I am assuming that Government is not itself likely to undertake cultivation on a large scale. Direct cultivation by Government is rarely profitable and, in addition, it is presumably undesirable that the State should enter into competition with private individuals. Our work therefore should aim at raising the standard of cultivation among the local agriculturists.

3. In the first place, it is essential that we must have something really better to offer the cultivator than he has at present. This entails the necessity for experiment and research. I cannot too strongly insist on this point. I have seen the confidence of cultivators in a Department upset by well-meaning, but misguided, attempts to introduce new methods before they have been thoroughly sifted and tested on a practical scale. Once the confidence of the cultivator is lost, it is very difficult to re-establish as he is, in most countries, very conservative and difficult to move unless he is absolutely convinced that the new method is likely to pay him better than the old.

Research is, therefore, needed in the first place to invent remedies for dealing with insect and fungoid pests, of which this country appears to be the favoured habitat, to breed better varieties of crops and domestic animals, to deal with problems concerning salt, drainage, &c., and to try new types of agricultural machinery.

After research comes experiment, in which the work of the research experts should be tested in the field under natural conditions.

Finally comes demonstration work, in which the new methods, machines or crops recommended can be practically demonstrated (against the corresponding local method) to the cultivator of the country. No real cultivator will adopt a new method or seed unless he has actually seen for himself, in his own particular tract, that method successfully tried or the new seed growing and giving better yields than his own.

Trained men will be required by the Department to carry out this programme. At present we are working with soldier subordinates, British and Indian. These are nearly all likely to leave, and we must face the eventuality that we have got to rely in the main on the local population for our trained personnel. The sooner a central farm and school of agriculture is started to train this staff the better.

I have attempted very briefly to sketch a policy which, if it leads to nothing else, will at least start a discussion in the right direction. I wish now to state what, in my opinion, is immediately required.

Baghdad, the capital of Iraq, should be the locality fixed for the School of Agriculture and the Research laboratories. This institute should have an experimental farm attached, on which the economic botanist and the cotton expert could conduct their plant breeding experiments and in which their selections could be

tested and compared on a field scale by the farm manager. Now varieties will have to be propagated on a considerable scale and a seed farm should be attached. Probably 1,500 acres would suffice, but if sheep breeding is contemplated, a larger area of desert land would also have to be acquired. At Baghdad every staple crop in Mesopotamia can be grown with the single exception of rice, and therefore the educational value of the farm for students at the school would be great. In addition, this site should, if possible, be close to the Military Dairy Farm, where dairying and the stock breeding could be observed by the student. The land between Waziriyah and the Tigris would provide a suitable stretch. Flow irrigation for the shitwi (summer) crops could be obtained from the Waziriyah, which is the tail end of the Khalis, and a pumping station could be established on the river to demonstrate lift irrigation.

Demonstration farms of about 300 acres each will be necessary at the headquarters of each Agricultural Circle Officer, whose headquarters now coincide with those of the Divisional Political Officers. I have already managed to start farms at the following centres :—

Nazariyah.
Amarah.
Hillah.
Baqubah.
Kadhimain.
Suwairah.
Samarrah.
Khaniqin.

The sites of all these, with the exception of Khaniqin, which is too remote, are excellent. Khazimain when the Baghdad Farm is started, will not be required.

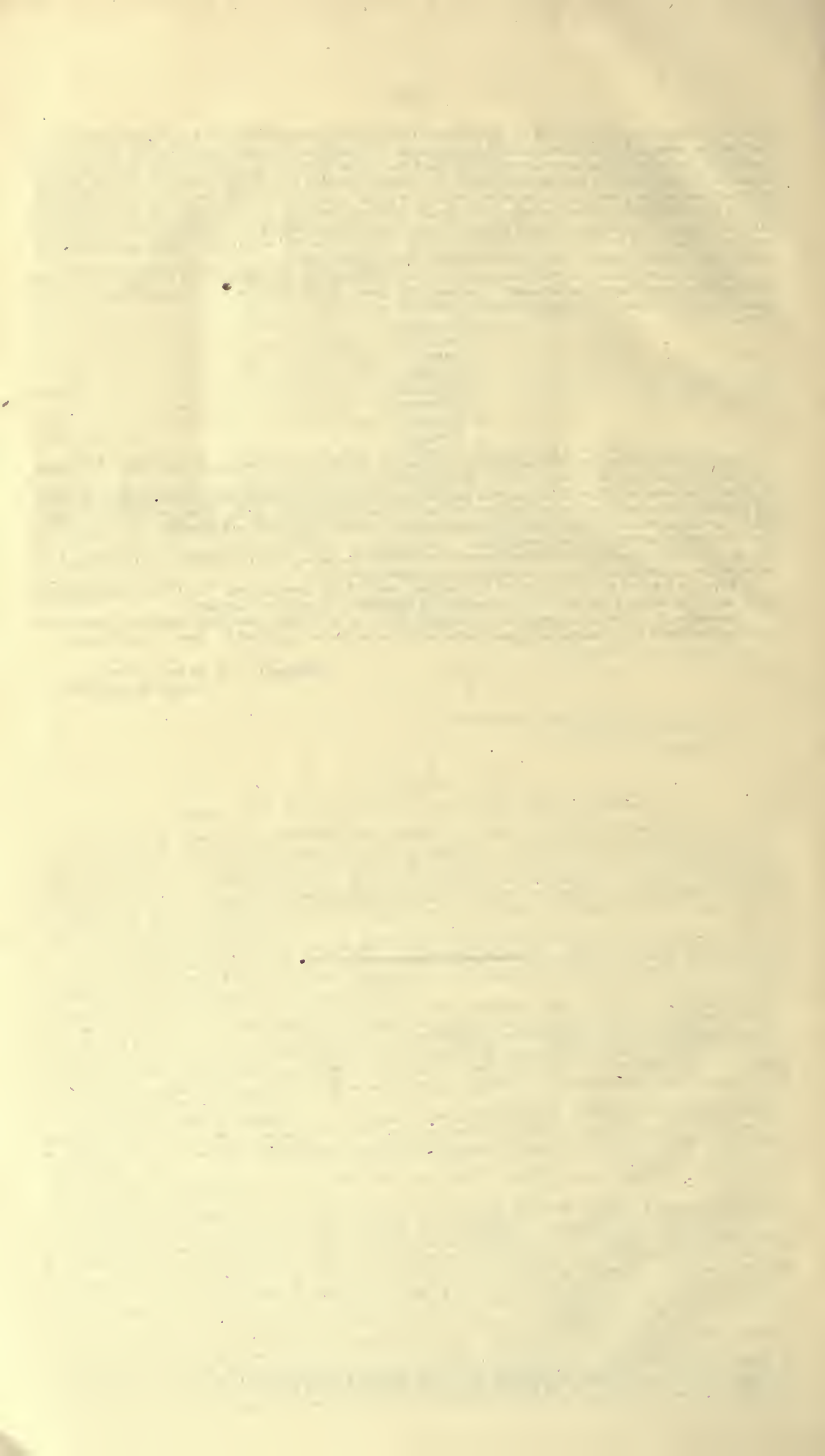
I have not attempted much this season, and work on the farms is practically confined to testing 'Uraq and Indian wheats and in the production of clean wheat and barley seeds. The foundation has been laid in each case, however, for suitable permanent farms. Hillah, Baqubah and Khaniqin are irrigated by flow. Amarah is partly flow and partly lift.

On the others, pumping installations have been established. The Shamiyeh district could probably best be served by a rice farm, as that is the staple crop in the tract.

I have not touched on the subject of the superior staff of the Department. Until the terms of service which are to be offered after the war are known, it is impossible to make any forecast.

Meanwhile, if my proposal regarding the establishment of a Central Research Institute, School and Experimental Farm be approved, I suggest that a small committee be appointed to select a suitable site.

(Signed) A. EVANS, Colonel,
Director of Agriculture.



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